

NNIS PNEUMONIA PILOT STUDY FLOW DIAGRAM
ALTERNATE CRITERIA FOR INFANTS AND CHILDREN

NNID #
Infection ID#
Patient ID#

Ward
Infection date
Ventilator:
Pathogen 1

☐ ICU
☐ HRN
☐ SP

Instructions: Complete form only if x-ray criteria are met

X-Ray

Patient **with underlying diseases**^{1,2} has **2 or more serial X-rays** with **one** of the following:

" New or progressive and persistent infiltrate
 " Consolidation
 " Cavitation
 " Pneumatoceles, in <1 y.o.

Patient **without underlying diseases**^{1,2} has **1 or more serial X-rays** with **one** of the following:

" New or progressive and persistent infiltrate
 " Consolidation
 " Cavitation
 " Pneumatoceles, in <1 y.o.

Signs and Symptoms

Infants **≤ 1 y.o.**

" Worsening gas exchange (e.g., O₂ desats [e.g., pulse oximetry <94%], ↑ O₂ req, or ↑ ventilation demand)

 and **three** of the following:

" Temperature instability with no other recognized cause
 " Leukopenia (< 4,000 WBC/mm³) or leukocytosis (≥ 15,000 WBC/mm³) and left shift (≥ 10% band forms)
 " New onset of purulent sputum,³ or change in character of sputum, or ↑ respiratory secretions, or ↑ suctioning requirements⁴
 " Apnea, tachypnea⁵, nasal flaring with retraction of chest wall or grunting
 " Wheezing, rales⁶, or rhonchi
 " Cough
 " Bradycardia (<100 beats/min.) or tachycardia (> 170 beats/min.)

Children **>1 or ≤ 12 y.o.**

At least **three** of the following:
 " Fever (>38.4° C/101.1° F) or hypothermia (< 36.5° C/97.7°F) with no other recognized cause
 " Leukopenia (< 4,000 WBC/mm³) or leukocytosis (≥ 15,000 WBC/mm³)
 " New onset of purulent sputum,³ or change in character of sputum, or ↑ respiratory secretions, or ↑ suctioning requirements⁴
 " New onset or worsening cough, or dyspnea, apnea, or tachypnea⁵
 " Rales⁶ or bronchial breath sounds
 " Worsening gas exchange (e.g., O₂ desats [e.g., pulse oximetry < 94%], ↑ O₂ req, or ↑ ventilation demand)

☐ **PNEU1:**
 Clinically defined pneumonia

Comments:

1. Occasionally, in nonventilated patients, the diagnosis of nosocomial pneumonia may be quite clear on the basis of symptoms, signs, and a single definitive chest radiograph. However, in patients with other pulmonary or cardiac disease (for example, congestive heart failure, interstitial lung disease, respiratory distress syndrome, bronchopulmonary dysplasia, pulmonary edema, or chronic obstructive pulmonary disease) or smoke or inhalation pulmonary injury, the diagnosis of pneumonia may be particularly difficult. Other non-infectious conditions (for example, pulmonary edema from decompensated congestive heart failure) may simulate the presentation of pneumonia. In these more difficult cases, serial chest radiographs must be examined to help separate infectious from non-infectious pulmonary processes. To help confirm difficult cases, it may be useful to review radiographs on the day of diagnosis, 3 days prior to the diagnosis, and on days 2 and 7 after the diagnosis. Pneumonia may have rapid onset and progression, but it does not resolve quickly. Radiographic changes of pneumonia persist for several weeks. As a result, rapid radiographic resolution suggests that the patient does not have pneumonia, but rather a non-infectious process such as atelectasis or congestive heart failure.
2. Note that there are many ways of describing the radiographic appearance of pneumonia. Examples include, but are not limited to, "air-space disease," "focal opacification," and "patchy areas of increased density." Although perhaps not specifically delineated as "pneumonia" by the radiologist, in the appropriate clinical setting these alternative descriptive wordings should be seriously considered as potentially positive findings.
3. Purulent sputum is defined as secretions from the lungs, bronchi, or trachea that contain ≥ 25 neutrophils and ≤ 10 squamous epithelial cells per low power field (x100). If your laboratory reports these data qualitatively (e.g., "many WBCs" or "few squames"), be sure their descriptors match this definition of purulent sputum. This laboratory confirmation is required since written clinical descriptions of purulence are highly variable.
4. A single notation of either purulent sputum or change in character of the sputum is not meaningful; repeated notations over a 24 hour period would be more indicative of the onset of an infectious process. Change in character of sputum refers to the color, consistency, odor and quantity.
5. In adults, tachypnea is defined as respiration rate >25 breaths per minute. Tachypnea is defined as >75 breaths per minute in premature infants born at <37 weeks gestation and until the 40th week; >60 breaths per minute in patients <2 months old; >50 breaths per minute in patients 2-12 months old; and >30 breaths per minute in children >1 year old.
6. Rales may be described as "crackles."